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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/659,906   | 09/11/2003  | Anand G. Dabak       | TI-28441B           | 4191             |
| 23494  | 7590        | 12/12/2005           | EXAMINER            |                  |
| TEXAS INSTRUMENTS INCORPORATED<br>P O BOX 655474, M/S 3999<br>DALLAS, TX 75265 |             |                      | CORRIELUS, JEAN B   |                  |
|  |             |                      | ART UNIT            | PAPER NUMBER     |
|  |             |                      | 2637                |                  |

DATE MAILED: 12/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                                      |                                     |  |
|------------------------------|--------------------------------------|-------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/659,906 | <b>Applicant(s)</b><br>DABAK ET AL. |  |
|                              | <b>Examiner</b><br>Jean B. Corrielus | <b>Art Unit</b><br>2637             |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 25 October 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 23-65 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 23-65 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 23-65 are objected to because of the following informalities:

Claim 23, line 4, "and a" should be replaced by ", complement of a". In addition, line 5, after "time", "the second signal transmitted at a second time and the conjugate of the first signal transmitted at the second time" so as to be consistent with the original disclosure see equations 5 and 6 or fig. 2.

Claim 34, line 3, " a complement of" should be inserted after "and". Claim 35, line 2, "complement of a" should be deleted. Claim 36, line 3, "complement of the " should be inserted before conjugate; lines 3-4, "complement of" should be deleted. As per claim 37, see claim 36; as per claims 38 and 39, see claim 34. as per claim 42, see claim 34. as per claim 43, see claim 35. as per claim 44, see claim 36. as per claim 45, see claim 37, as per claim 46, see claim 38. as per claim 47 see claim 46. as per claims 50-55, see claims 34-39, respectively. As per claim 58-63, see claims 34-39, respectively. Note that any claim whose base claim is objected is likewise objected. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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3. Claims 34-65 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 34-65 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The original disclosure, see for instance fig. 3 and equations 5 and 6, that requires the "correction circuit" receives a first signal comprising a first symbol transmitted from a first antenna at a first time and a complement of a conjugate of a second symbol transmitted from a second antenna at the first time and receives a second signal comprising the second symbol transmitted from a first antenna at a second time and a conjugate of the first symbol from the second antenna at the second time, the correction circuit producing a first symbol estimate in response to the first symbol and the complement of the conjugate of the second symbol and producing a second symbol estimate in response to the second symbol and the conjugate of the first symbol. Hence, the claimed limitations "first symbol and second symbol" only correspond to the first signal, ( i. e. signal on line 610 of fig 3 or equation 5). However, the signal on line 614 of the correction circuit has been omitted. Such signal is required in order for the correction circuit fig. 3 to determine the first symbol estimate and the second symbol estimate. The omitted elements are shown in the following proposed claimed amendment in underlining :

--34. (Amended) An apparatus, comprising:

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a correction circuit coupled to receive a first signal comprising a first transmitted symbol from a first antenna at a first time and a complement of a conjugate of a second transmitted symbol from a second antenna at the first time and to receive a second signal comprising the second transmitted symbol from a first antenna at a second time and a conjugate of the first transmitted symbol from the second antenna at the second time, the correction circuit producing a first symbol estimate in response to the first received symbol and the complement of the conjugate of the second received symbol and producing a second symbol estimate in response to the second received symbol and the conjugate of the first received symbol; and

a combining circuit coupled to receive a plurality of symbol estimates including the first symbol estimate and the second symbol estimate, the plurality of symbol estimates corresponding to a respective plurality of signal paths, the combining circuit producing a first symbol signal and a second symbol signal in response to the plurality of symbol estimates. --

Claim 35 should be canceled because it would be redundant.

Claim 36 should be canceled because it would be redundant.

Claim 37, line 1, "36" should be changed to -34--.

Claim 38 "complement of the" should be inserted before conjugate.

Claim 39 see claim 38.

Claim 42 includes similar limitations as in claim 34, the same comment applies.

As per claim 43, see claim 35.

As per claim 44, see claim 36

As per claim 45, see claim 37.

As per claim 46, see claim 38.

As per claim 47, see claim 39.

As per claim 50 , see claim 34.

As per claim 51, see claim 35.

As per claim 52, see claim 36

As per claim 53, see claim 37.

As per claim 54, see claim 38.

As per claim 55, see claim 39.

As per claim 58 , see claim 34

As per claim 59, see claim 35.

As per claim 60, see claim 36

As per claim 61, see claim 37.

As per claim 62, see claim 38.

As per claim 63, see claim 39.

Note that any claim whose base claim is rejected is likewise rejected.

### ***Specification***

4. The disclosure is objected to because of the following informalities: Page 5, line 14, "S1" should be replaced by "S2". In addition, Equation 6, "S1" should be replaced by "S2" so as to be consistent with fig. 2.

### ***Terminal Disclaimer***

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5. The terminal disclaimer filed on 10/25/05 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of US patent No. 6,643,338 has been reviewed and is accepted. The terminal disclaimer has been recorded.

### ***Double Patenting***

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 34-65 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 26-45 of copending Application No. 10/601,866. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 34 is substantially encompassed by claim 26 except for some minor modifications. Similarly, Claim 35 is substantially encompassed by claim 27. Claim 36 is substantially encompassed by claim 28.

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Claim 37 is substantially encompassed by claim 29

Claim 38 is substantially encompassed by claim 30

Claim 39 is substantially encompassed by claim 31

Claim 40 is substantially encompassed by claim 32

Claim 41 is substantially encompassed by claim 33

Claim 42 is substantially encompassed by claim 36

Claim 43 is substantially encompassed by claim 37

Claim 44 is substantially encompassed by claim 38

Claim 45 is substantially encompassed by claim 39

Claim 46 is substantially encompassed by claim 40

Claim 47 is substantially encompassed by claim 41

Claim 48 is substantially encompassed by claim 42

Claim 49 is substantially encompassed by claim 43

Claim 50 is substantially encompassed by claim 26

Claim 51 is substantially encompassed by claim 27

Claim 52 is substantially encompassed by claim 28

Claim 53 is substantially encompassed by claim 29

Claim 54 is substantially encompassed by claim 30

Claim 55 is substantially encompassed by claim 31

Claim 56 is substantially encompassed by claim 32

Claim 57 is substantially encompassed by claim 33

Claim 58 is substantially encompassed by claim 36

Claim 59 is substantially encompassed by claim 37



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Claim 60 is substantially encompassed by claim 38

Claim 61 is substantially encompassed by claim 39

Claim 62 is substantially encompassed by claim 40

Claim 63 is substantially encompassed by claim 41

Claim 64 is substantially encompassed by claim 42

Claim 65 is substantially encompassed by claim 45.

It would have been obvious to one skill in the art to claim the invention as shown in the pending application as a variation of claims in the co-pending application for esthetic reasons.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 23-<sup>33</sup>~~65~~ are rejected under 35 U.S.C. 103(a) as being unpatentable over Alamouti et al in view of Applicant's admitted prior art fig. 6 and fig. 7.

As per claim 23, Alamouti et al discloses a circuit fig. 4 having a correction circuit (53 and 54) coupled to receive a first input signal 51 from a first antenna 31 of an external source 10 and a second input signal 52 from a second antenna of an external source 10, the first and the second input signals corresponding to

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the same datum see table 1  $s_0$  and  $s_0^*$ , the correction circuit (53 and 54) producing a first symbol estimate in response to the first symbol and the second symbol estimate see col. 4, lines 25-27 and col. 6, lines 63-65, combining circuit 55 coupled to receive a plurality of symbol estimates from estimator 53 including the first symbol estimate and coupled to receive a plurality of second symbol estimates including the second symbol estimate from estimator 54, the plurality of first symbol estimates corresponding to a respective plurality of signal paths see fig. 4 the combining circuit 55 producing a first symbol signal and a second symbol signal in response to the plurality of first and second symbol estimates see fig. 4, the plurality of symbol estimates corresponding to a respective plurality of signal paths and producing a first symbol signal in response to the plurality of symbol estimates see output of detector 56. However, as acknowledge by the comment dated September 11, 2003, Alamouti does not explicitly teach that the mobile antenna is arranged to receive a plurality signals from each remote antenna. Alamouti teaches the plurality of signals including a first signal  $s_0$  transmitted as a first time and the conjugate of the second signal  $s_1$  transmitted at a second time rather than the first time. However, configure the encoder so as to output the conjugate of the second signal to the antenna for transmission at the first time rather than the second time would have been obvious to one skill in order to satisfy coding requirements. In addition, applicant's admitted prior art teaches a mobile antenna is arranged to receive a plurality signals from each remote antenna see page 3, lines 3-9. Given that fact, it would have been

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obvious to one skill in the art to incorporate such a teaching in Alamouti so as to enhance mitigation of multipath fading.

As per claim 24, Alamouti further teaches a circuit 55 considered as the claim combining circuit coupled to receive a plurality of first symbol estimates see output of estimator 53 including the first symbol estimate and coupled to receive a plurality of second symbol estimates see output of estimator 54 including the second symbol estimate, the combining circuit producing a first symbol signal see the first output of detector 56 in response to the plurality of first symbol estimates and producing a second symbol signal see output of the detector 56 in response to the plurality of second symbol estimates.

As per claim 25, it would have been obvious to one skill in the art at the time of the invention to form the combining circuit and the correction circuit on a single integrated circuit in order to minimize cost.

As per claim 26, it is well known in the art to format a signal by including a pilot symbol, a transmit power control symbol, a rate information symbol and payload. Given that it would have been obvious to one skill in the art to format the first and second signal in such a manner so as to be compliant with existing communication standard. The same comment applies to claim 27.

As per claim 28, it would have been obvious to one skill in the art to configure Alamouti in such a way to have a total diversity of each of the first and second symbols of at least twice the number of transmitting antennas so as to satisfy system design requirements.

As per claim 29, it would have been obvious to one skill in the art to configure Alamouti in such a way as to receive the first and second signals as WCDMA signal  $t$  so as provide Alamouti with flexibility to process signals from different users.

As per claim 30 see claim 28.

As per claim 31, the first and the conjugate of the second symbol are received over a common channel. See fig. 3.

As per claim 32, it would have been obvious to one skill in the art to configure Alamouti to receive the first and second signals over a common frequency band so as to reduce the complexity of the receiver, as signals received from different frequency band would have required a more complex receiving circuit.

As per claim 33, the first input signal comprises data symbol and the second input signal comprises a complex conjugate of the data symbol see table 1,  $s_0$  and  $s_0^*$ .

Claims 34-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alamouti et al.

As per claim 34, Alamouti et al discloses a circuit fig. 4 having a correction circuit (53 and 54) coupled to receive a first input signal 51 from a first antenna 31 of an external source 10 and a second input signal 52 from a second antenna of an external source 10, the first and the second input signals corresponding to the same datum see table 1  $s_0$  and  $s_0^*$ , the correction circuit (53 and 54)

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producing a first symbol estimate in response to the first symbol and the second symbol estimate see col. 4, lines 25-27 and col. 6, lines 63-65, combining circuit 55 coupled to receive a plurality of symbol estimates from estimator 53 including the first symbol estimate and coupled to receive a plurality of second symbol estimates including the second symbol estimate from estimator 54, the plurality of first symbol estimates corresponding to a respective plurality of signal paths see fig. 4 the combining circuit 55 producing a first symbol signal and a second symbol signal in response to the plurality of first and second symbol estimates see fig. 4, the plurality of symbol estimates corresponding to a respective plurality of signal paths and producing a first symbol signal in response to the plurality of symbol estimates see output of detector 56. Alimouti further teaches the plurality of signals including a first signal  $s_0$  transmitted as a first time and the conjugate of the second signal  $s_1$  transmitted at a second time rather than the first time. However, configuring the encoder so as to output the conjugate of the second signal to the antenna for transmission at the first time rather than the second time would have been obvious to one skill in order to satisfy coding requirements.

As per claim 35, Alimouti teaches transmitting the second symbol  $S_1$  and the conjugate of the first symbol at different time rather than the same second time. However, as indicated above in reference to claim 34, such limitation does not involve any inventive and would have been obvious to one skill in the art for the reason set forth in claim 34.

As per claim 36, the correction circuit produces the first symbol estimate and the second symbol estimate in response to the first transmitted symbol the

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second transmitted symbol the conjugate of the second and the complement conjugate of the first symbol see col. 7, lines 19-51.

As per claim 37 see claim 36 and in addition, the first and second symbol are generated in response to a first estimate and second estimate see col. 7, lines 19-51.

As per claim 38, the first and the conjugate of the second symbol are received over a common channel. See fig. 3.

As per claim 39, it would have been obvious to one skilled in the art to configure Alamouti to receive the first and second signals over a common frequency band so as to reduce the complexity of the receiver, as signals received from different frequency band would have required a more complex receiving circuit.

As per claim 40, the plurality of symbol estimates corresponds to one of the first and second symbols see col. 7, lines 40-51.

As per claim 41, it would have been obvious that the combiner would have been a rake combiner so as to allow the receiver to combine multipath signals from plurality of rake receiver.

As per claim 42, see claim 34.

As per claim 43 see claim 35.

As per claim 44, see claim 36.

As per claim 45, see claim 37.

As per claim 46, see claim 38.

As per claim 47 see claim 39.

As per claim 48, see claim 40.

As per claim 49, see claim 41.

As per claim 50, see claim 34.

As per claim 51 see claim 35.

As per claim 52, see claim 36.

As per claim 53, see claim 37.

As per claim 54, see claim 38.

As per claim 55 see claim 39.

As per claim 56, see claim 40.

As per claim 57, see claim 41.

As per claim 58, see claim 42.

As per claim 59, see claim 43.

As per claim 60, see claim 44.

As per claim 61, see claim 45.

As per claim 62, see claim 46.

As per claim 63 see claim 47.

As per claim 64, see claim 48.


As per claim 65, see claim 49.

10. Applicant's arguments with respect to claims 23-65 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jean B. Corrielus whose telephone number is 571-272-3020. The examiner can normally be reached on Maxi-Flex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Jean B Corrielus  
Primary Examiner  
Art Unit 2637  
12-9-05